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The emotional reactions above described may each be interpreted, therefore, as making the organism more efficient in the struggle which fear or rage or pain may involve. And that organism which, with the aid of adrenal secretion, best mobilizes its sugar, lessens its muscular fatigue, sends its blood to the vitally important organs, and provides against serious hemorrhage will stand the best chance of surviving in the struggle for existence.[10]

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REVIEWS AND ABSTRACTS OF LITERATURE

The Scope of Formal Logic. A. T. SHEARMAN. London: University of London Press. 1911. Pp. xiv + 162.

In a previous work, "The Development of Symbolic Logic," Mr. Shearman gave an account of the "older" work of Boole, Venn, Schröder, etc., *i. e.,* of the "pre-Peanesque logicians," as he is pleased to call them. The present volume is, in a way, a continuation of the earlier one. It gives a brief exposition of the logical work of Frege, Peano, and Bertrand Russell. For by "Formal Logic" Mr. Shearman means here what has been variously designated by the names "symbolic logic," "mathematical logic," "algebra of logic," "symbol logic" (Mrs. Ladd-Franklin), "logistic" (Couturat). This kind of logic has not yet found its fitting name; but it is "making history." The purpose of "The Scope of Formal Logic" is to convince the reader of the importance of the work in this field, and, without presupposing any familiarity with the writings of Frege, Peano, Russell, to lead the uninitiated to these fountain-heads of modern logical thought. In the first chapter a number of important terms, such as "propositional function," "variable," etc., are elucidated. In the second chapter Frege's, Peano's, and Russell's symbols, or at least some of the more frequent among them, are explained by translating several propositions, some simple, some more complex, from their symbolic statements into English. This is continued in the third chapter which exhibits the methods of proof in "Formal Logic." Chapter IV. is devoted to a treatment, by means of these symbolic methods, of opposition, conversion, syllogism, etc., *i. e.,* the usual subject-matter of ordinary logic. Chapter V. shows "(1) that arithmetical notions and processes may be replaced by logical notions and processes, (2) that geometrical notions and processes may be similarly replaced, and (3) that general logic *ought,* for scientific purposes, or to enable us to reach conclusions that have always been supported by common sense, to be regarded as lying at the basis of pure mathematics" (p. 130). The remaining two chapters are given over to a "philosophical treatment of number" and of "space." The author has given here more of his own thoughts, though he makes acknowledgment to Frege in the discussion of number, to Russell in that of space; he tries "to indicate in a concrete manner the fact that the treatment of number in the preceding chapters implicitly rests upon that conception of number which is here set forth" (p. 131) [and similarly in the next chapter with reference to the nature of space]. But the account is vague, and, as it stands, has little direct connection with "Formal Logic." It is a presentation of "views concerning number that are *unfolded by philosophy*"[1] (p. 143) rather than a development of the subject by the methods expounded in the previous chapters. The "modern logician" will, no doubt, be greatly relieved to learn that his procedure is "in accordance with the *dictates of philosophy*,"[2] that his propositions "imply nothing at variance with the teaching that is unfolded by philosophy" (p. 150), that "the modern treatment of spatial problems . . . proceeds along the lines *which philosophy sets forth as those which should be followed*."[3] But one would like to know what this mysterious and imperious "philosophy" is, and whence it gets an authority over the results of "logic." The reviewer misses in these chapters a clean separation of logical from psychological problems. Take, for example, such statements as the following: "Number is conceptual" because, amongst other reasons, "we are able to deal with numbers in propositions without being able either to perceive or to have a mental picture of any corresponding entities" (p. 132). "If a concept possesses these three attributes I shall, since no other species of mental entities or act of attention possesses them, take the three to constitute the *definition* of a concept. A concept, that is to say, is a mental entity or act of attention which (1) is such that we can ask concerning it if there exist corresponding objects, (2) is not necessarily accompanied by corresponding perceptual objects, and (3) may exist without the possibility of there being corresponding percepts or images" (p. 133, note). The writer is evidently a champion of "imageless thought"; psychologists will be eager to have him present his experimental evidence; but "logicians," I mean "modern logicians," have no concern with it; having enough problems of their own, they are, or should be, no longer willing to spoil a good psychological problem by hasty and dogmatic solutions on so-called "logical" grounds. "Psychological" solutions of logical problems are beginning to be recognized as misleading; "logical" solutions of psychological problems are, at the present stage of experimental psychology, pathetic.

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[10] For a detailed discussion of the interpretation here outlined see Cannon, *American Journal of Physiology,* 1914, XXXIII., page 356.

Regarding "definitions," the author has not "fallen into line with the new exponents of logic" (p. xi). "Mr. Russell . . . does not explain how it is that definitions are used in the same way as assertions" (p. 27). This point is well taken. But I do not see that Mr. Shearman has removed the difficulty. His distinction between definitions in symbolic logic and in philosophy in that the latter are "naturally selected," the former "artificially selected" (pp. 28, 29) does not go to the root of the matter. The current theories regarding the nature and function of definitions in logic, or any other deductive system, are at fault, and need reexamination, if we are to get rid of troubles of which the one pointed out by Mr. Shearman is an example, and only an example.[4]

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[1] Italics are mine.

[2] Page 145; *cf.* page 158. Italics mine.

[3] Page 159; *cf.* pages 161, 162. Italics mine.

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JOURNALS AND NEW BOOKS

MIND. October, 1913. *Some Antecedents of the Philosophy of Bergson. The Conception of "Real Duration"* (pp. 465–483): ARTHUR O. LOVEJOY. – The account of the nature of time as developed by Bergson was not an innovation, but it had been earlier developed, and developed as deductions from Kant, by Ravaisson, Dauriac, and Pillon. *Life and Logic* (pp. 484–492): H. WILDON CARR. – Mr. Bosanquet, in his recent Gifford lectures, misinterprets M. Bergson's theory of the indeterminism of life, fails to see that there is no opposition between his and Bergson's account of the logical process, and furthermore fails to prove that logic is creative. *Idealism and the Reality of Time* (pp. 493–508): HUGH A. REYBURN. – Against the current criticisms of idealism and absolutism it is maintained that "not less but more system is required." Absolutists must recognize that time is real, external, and has a place in the absolute. Criticizes in detail Bosanquet, who fails to give due recognition to the externality and reality of time. *Pragmatic Realism—The Five Attributes* (pp. 509–525): JOHN E. BOODIN. – There are five "ultimate types of differences which reality makes to our reflective conduct." These "*summa genera* in the reflective evaluation of the character of our world" are stuff, time, space, consciousness, and form. They are irreducible to terms of each other, yet they all make a difference to our creative purposes. *Discussions: Analysis of Categorical Propositions* (pp. 526–531): E. E. C. JONES. *The "Working" of Truths and Their "Criterion"* (pp. 532–538): F. C. S. SCHILLER. *On Metageometry and the Sense of Direction* (pp. 539–543): H. S. SHELTON. *Realism and Pragmatism* (pp. 544–548): RALPH BARTON PERRY. *The Meaning of Kant's Copernican Analogy* (pp. 549–551): NORMAN KEMP SMITH. *Critical Notes:* G. E. Moore, *Ethics:* H. P. COOKE. O. Külpe, *Die Realisierung: Ein Beitrag zur Grundlegung der Realwissenschaften:* A. WOLF. D. L. Murray, *Pragmatism:* H. V. KNOX. J. Royce, *William James and Other Essays:* R. F. A. HOERNLÉ. E. Boutroux, *William James:* R. F. A. HOERNLÉ. L. Brunschvicg, *Les Étapes de la Philosophie Mathematique:* P. E. B. JOURDAIN. Baron F. von Hügel, *Eternal Life: A Study of Its Implications and Applications:* A. F. TAYLOR. *New Books. Philosophical Periodicals. Notes and Correspondence.*

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[4] I have briefly stated my views on this point in a series of propositions which were read at the Cambridge meeting of the American Philosophical Association in 1911 and published in the proceedings of that meeting. *Philosophical Review*, Vol. XXI., pages 210 ff. I hope to publish a more detailed statement in this JOURNAL at an early date.